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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS.

No. 316

EUROPEAN COMMERCIAL AERONAUTICS.

Prepared for U. S. Army Air Service,
By Lieut. J. Parker Van Zandt,
from data obtained during his inspection trip,
July - September, 1924.

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EUROPEAN COMMERCIAL AERONAUTICS.*

By Lieut. J. Parker Van Zandt, Air Service, U. S. Army.

Introduction

During the months of June to September, 1924, I personally visited the principal airports of Europe and traveled as a passenger some 6500 air miles on English, French, Roumanian, Polish, German and Dutch air lines in order to investigate the development of commercial aviation abroad. The results of the investigation are embodied in a series of reports, of which a summary of the general findings is given below.

Summary of Findings

1. Attitude of European Governments.— All the principal countries of Europe recognize commercial aeronautics as an indispensable factor in the national defense. In spite of serious financial stringencies the Governments of England, France, Switzerland, Hungary, Roumania, Poland, Germany, Holland, Belgium, Denmark and others are contributing liberally to the support and encouragement of commercial air lines.

2. Character of direct subsidies.— Government aid in general is of two forms: direct and indirect. Direct aid, or sub-

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sidy grant, differs widely in its character and amount between the different countries. In England and Holland it is in the form of a generous loan without interest over a period of years (ten years in England, four in Holland). In Germany it is a payment in return for the maintenance of specified air mail routes. In France it is at present an annual money grant in accordance with the number and character of airplanes maintained and the number of kilometers flown.

Character of indirect aid.— Indirect aid includes the creation of airports at the principal cities, at which Government-erected hangars and other facilities are rented to the operating companies for a nominal sum; elaborate methods for the dissemination of meteorological information by Government radio stations; the free use of radio communication facilities; the development of technical appliances for commercial aviation, by Government agencies; the loan of improved types of transport airplanes; the passage of laws limiting the liability of air transportation companies; and so forth. In a number of cases municipal airports have been created at the expense of the cities (as at Konigsburg, Danzig and Rotterdam).

3. Extent of air routes.— As a result of Government and municipal aid a comprehensive net of air lines is in operation over the continent; there are nine services daily from London across the Channel (by English, French, Dutch and German companies); one may travel by air direct from London to Constantino-

ple, Turkey; to Warsaw, Poland; to Moscow, Russia, via Berlin, or to Helsingford, Finland; from Paris to Copenhagen, Denmark; from Toulouse, France to Casablanca, Morocco via Barcelona, Spain; from Geneva, Switzerland to Budapest, Hungary; and elsewhere (see attached map). Some of these lines have now been in regular operation for over five years and an important body of operating experience has been built up.

None self-supporting.— It should be noted from an economic point of view that not one of these lines is as yet self-supporting, and without the intervention of their respective Governments could not long continue. The trend of Government policy, however, is everywhere toward increased subsidy with a consequent steady expansion in commercial air activities.

4. Educational effect of air lines.— The widespread and constantly increasing public and Government interest in Europe in commercial aeronautics reflects the importance everywhere accredited to aviation and to the development of an adequate aeronautical reserve. The European public appears much more awake to the significance of aviation, both as an element of national defense and as a transportation agent, than does the American public. This may result in part from the political map of Europe and from the fact that the lessons of the War were brought more vividly home to them; but it is also in no small measure due to the educational effect of the continued

regular operation of air lines throughout the Continent. The position of aeronautics in Europe appears to be daily growing stronger.

5. Attitude of the leading industrialists of Europe.- Of special significance is the fact that in Germany, Holland, England and France the heavy investors in aviation are the leading industrial, shipping, banking and forwarding organizations of Europe. The two predominant motives which have undoubtedly influenced these representative concerns to support aviation are: (1) a patriotic interest to see their country adequately represented in the exploitation of air lines, and (2) a conviction that air transportation is destined to fill an important role in the economic life of the Continent. There is evidence that the abandonment of several of the air lines would prove a serious handicap to business interests which have already come to rely upon them.

6. Movement toward one centralized organization in each nation.- The combined support of the large industrial interests has led to a movement toward an amalgamation of all the operating air companies in each country, especially notable in England, Holland and Germany. In France the operation of the subsidy grants has interfered somewhat with the natural economic tendency, but a partial amalgamation has already taken place and may be expected to develop further. The nature of air transportation is opposed to the operation of short routes alone

(such as the London-Paris line, 235 miles) and its advantages can be properly realized only by means of a closely knit and comprehensive organization.

7. The fundamental political handicap in Europe.— This fact directs attention to one of the fundamental difficulties with which practically every European nation is faced in the proper development of air transportation; the principal lanes of business exchange in almost every instance involve flight into or over one or several foreign countries; yet each country is intent upon developing its own national air transportation resources and regards with disfavor or distrust the operation of foreign competitors within its boundaries. This has already interfered with the development of air lines along normal business lines and without doubt will continue to be a serious stumbling-block for many years to come.

The natural advantage of the United States.— The United States is perhaps the most fortunate country in the world in this respect as its geographic extent, freedom from custom restrictions, common national interests and homogeneous business methods make it ideal for the natural development of air transportation. At least three foreign companies (German, French and English) are contemplating entering the United States, as a freer field for their activities.

8. Lower Insurance Rates indicate status as regards safety.-

The records of European air lines indicate that financial matter, merchandise and freight of all kinds may often be transported by air with greater safety from loss or damage than by the usual channels of boat or rail. Thus the insurance rates for all risks, including theft, for articles such as dresses, furs, jewelry, fragile goods, light machinery, etc., between London and the Continent are several times less by air than by boat and rail. Much gold bar and silver are shipped across the channel by air, one airplane alone having carried \$2,000,000 worth. In Germany business men traveling by air are under no obligation to pay additional premiums to protect their life insurance policies. There is conclusive evidence that an air service properly organized and maintained can be operated with a satisfactory standard of safety.

9. Satisfactory regularity during summer.- The records for regularity of service are steadily improving and are practically on a par with railroad service during the summer months of the year.

Winter flying in Europe more difficult than in U.S.- The development of winter flying has not progressed as far as in this country, where the U. S. Post Office air mail has been able to maintain an excellent regularity throughout the year. In this respect again the United States is more fortunate, as the prevalent fogs in England and North Europe render winter

flying unusually difficult.

10. Progress in night flying.- Experiments in night flying are under way between London and Paris, between Berlin, Copenhagen and Stockholm, between Belgrade and Bucharest, and on the Paris-Prague route. Night flying requires a thorough ground organization and political difficulties again seriously complicate the problem as the terrain of different countries is involved in almost every instance. The night flying of the U.S. Post Office air mail is at present in advance of Europe. It is the general opinion abroad that there are no unsurmountable technical difficulties in regular night operation.

11. Mail and goods traffic only contingent upon regular service.- Mail and merchandise are generally recognized as the most suitable and profitable form of air traffic. The greatest single difficulty in Europe at present in attracting this type of traffic is the lack of sufficient regularity of service during the winter months. A truly surprising variety of articles travel by air and there is abundant evidence that with an improved regularity of service throughout the winter the total volume would at once increase by several hundred percent. The record of the French line between Southern France and Morocco, where winter flying conditions are more favorable, demonstrates that mail and goods will seek out an air service when a satisfactory reliability of operation is maintained.

12. Passenger traffic.— The volume of passenger traffic is increasing every year, more than 1000 passengers a week leaving London by air for the Continent during certain seasons of the summer. The majority of these passengers out of London are American tourists; on other routes, however, other nationals are generally in the majority. It appears that the German and the Dutch take up air travel most naturally and readily, then the English and finally the French. From an economic point of view passengers are the least interesting form of traffic, as questions of comfort and convenience, airsickness, legal liabilities, etc., enter to complicate the operating problem. Travel by air is not yet sufficiently comfortable to make long distance passenger routes practicable, although experience indicates that travelers quickly become adjusted to the present discomforts and hazards of flight and will put up with a great deal for the sake of the expedition involved.

13. The need of an improved transport airplane.— No really satisfactory commercial transport airplane has yet been developed and the technical agencies of the various governments are now seriously attacking the problem. The desirable features are: (1) a high pay load per HP. installed, (2) a large, comfortable cabin, and (3) a high cruising airspeed; together with a low landing speed and a good rate of climb on take-off. So far it has not been possible to combine all these features in any one airplane. In general the airspeed and rate of climb

have been sacrificed for the sake of a high pay load per HP. and large cabin. In one instance the first three features, above, have been obtained at the price of a high landing speed (over 70 M.P.H.), and a poor rate of climb; in spite of these handicaps the airplane has operated with an excellent safety record for over three years. There has been an effort to develop airplanes with three or more engines; to date, however, single engine airplanes have proven to be actually more reliable in service as well as more economical to operate and more efficient as load carriers.

An economical form of indirect subsidy.— The development of a satisfactory commercial transport airplane for operation in this country constitutes one of the most effective as well as most economical forms of indirect aid open to the United States Government for the encouragement of an air transportation industry.

14. The operation of commercial air services shows everywhere an encouraging decrease in the unit costs per ton-mile flown as the old war stocks are replaced by more suitable equipment, the maintenance problems are better understood, and the aggregate mileage is increased. The effective life of the flying equipment, when properly maintained, has been found to be limited only by obsolescence and inadequacy rather than by actual depreciation. Airplanes of the all-metal type, welded

steel tube and "stick-and-wire" have each been flown over 1500 hours without noticeably ageing. Payments for third-party liabilities have been practically negligible in five years of service and insurance rates against all classes of risks are steadily decreasing. Actual European cost figures cannot be applied to the United States without careful interpretation, as the rates of exchange, varying standards of living, wage scales, cost of materials, and the subsidy relations make direct comparison difficult. Nevertheless it is evident that the proportion of necessary reserves to actual operating expenses is considerably lower than was at first estimated.

15. Meteorological information and the use of wireless telephony.- Europe is definitely in advance of the United States in the development of an efficient system for meteorological information along air routes and in the use of wireless telephony communication between airplanes and fields. England in particular has developed an excellent system for informing airplanes while in flight, by radio telephony, of weather conditions ahead, of their position when out of sight of land, and so forth. It has been found that radio is of immense value in improving reliability of service and that it is invaluable as flights are attempted under more and more difficult weather conditions, and at night. The development of adequate equipment and trained personnel for such a service in this country is another effective means to promote the establishment of air trans-

portation in the United States. The Army Air Service airways system offers an excellent field for such an application.

16. Difficulties involved in direct subsidy.-- The experience of Europe indicates that direct subsidies, or money grants, are often of doubtful permanent value. If the subsidy is hedged about with a multiplicity of restrictions the normal development of air transportation is seriously interfered with; if granted too freely it may be employed for temporary profit in a manner quite opposed to the permanent good of the industry. France, which has most lavishly supported commercial aeronautics, has suffered severely on both counts and in spite of several changes in the basis of subsidy grants has failed to escape from one or the other pitfall. The same difficulties in somewhat lesser degree have arisen both in England and in Germany. There is little reason to believe that direct subsidy would meet with any better success in the United States. A minimum of government and legislative restraint and a maximum of indirect aid appears to be the most fruitful policy for the encouragement of an industry as new and formative as aeronautics.

Indirect subsidy more effective and economical.-- Indirect aid appears most effective (a) in the establishment of adequate terminal fields and route facilities along the principal traffic lanes and (b) in the development of technical equipment and methods essential to the successful operation of air transpor-

tation services. In the former class are included municipal airports with hangar and office facilities available for a nominal rental and the creation of navigation aids such as light beacons, radio stations and meteorological posts along the routes. In the latter class, the development of a satisfactory commercial transport airplane; and of a practical method for directing aircraft by radio at night along an organized airway.

Indirect aid of this character relieves the operating companies of large overhead expenses in ground organization during the early period when the volume of traffic is small and of the research expenses involved in the development of suitable technical equipment; it does not, however, interfere with their development in accordance with strict business principles. This is no more than the established policy of the United States Government in the analogous field of shipping and it is believed will be found the most economical and effective means of developing an air transportation industry.

C o n c l u s i o n s

17. The principal lessons from the experience of Europe in five years of subsidized commercial aeronautics may be stated as follows:

(a) Air transportation under suitable conditions can be conducted with a degree of regularity, safety and dispatch sufficient to establish it as an important additional

channel of commerce in the transportation resources of a nation.

(b) When so established and operated, mail, goods and passengers will not hesitate to seek out and utilize it, even at a considerably increased traffic charge.

(c) The development of self-supporting air transportation services in Europe is seriously limited in a number of ways by the conflicting national interests of the many countries involved; the United States, on the other hand, is better suited to the immediate establishment of a sound aeronautical industry than any country in the world.

(d) A Government policy of indirect encouragement by the development of technical equipment and methods suitable for commercial air transportation, by the establishment of the necessary ground facilities along the principal traffic lanes of the country and by contracting for the carriage of air mail, will prove more economical and permanently effective than any form of direct subsidy.

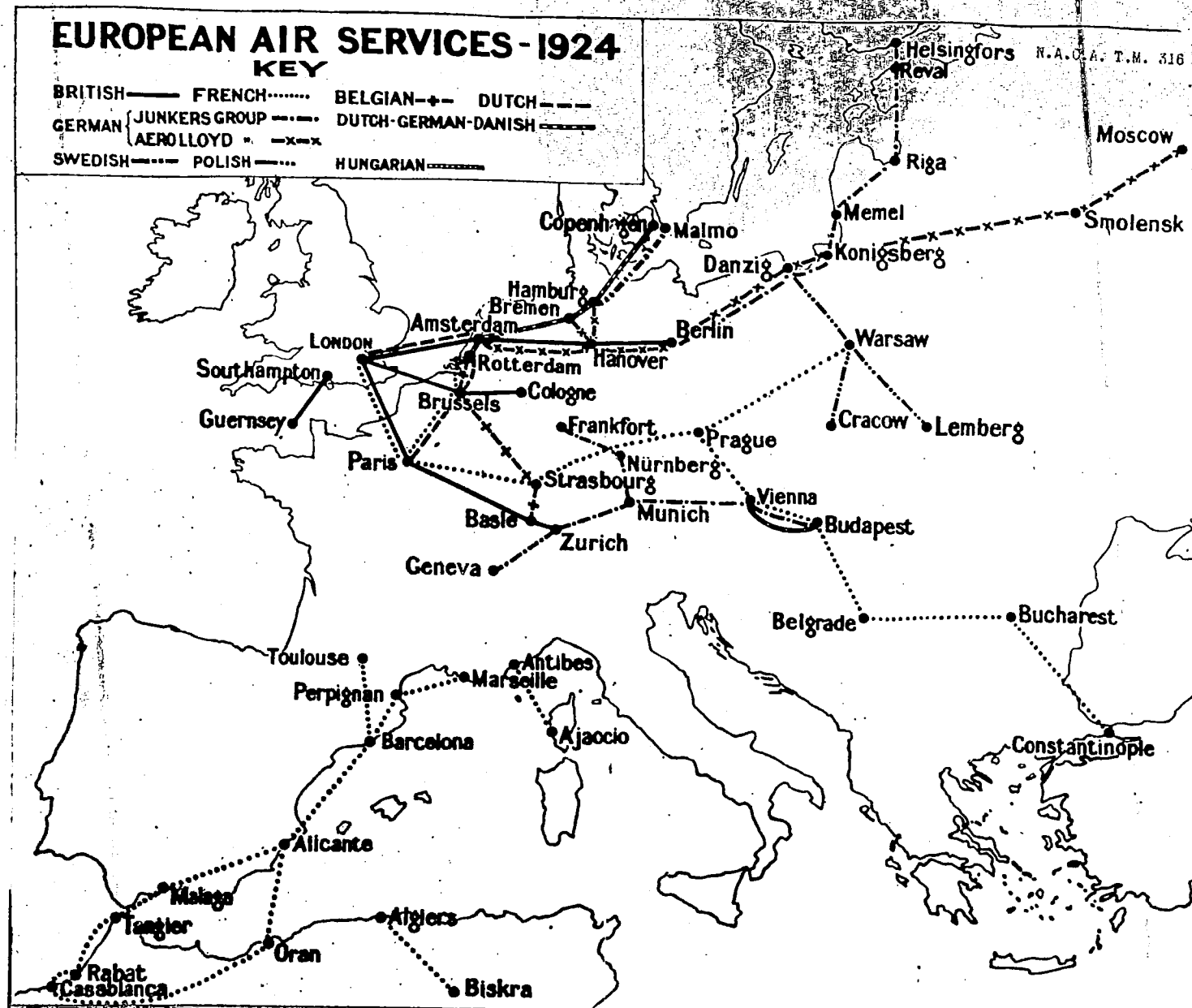
(e) The favorable attitude of the largest banking, shipping and industrial organizations of Europe toward air transportation should be brought to the attention of leading business men of America with a view to enlisting their interest in the establishment of air transportation on a similar national basis in the United States.

(f) By the pursuance of a Government policy of indirect encouragement, as outlined above, the United States will be able to overcome the temporary advantage of Europe and to take the lead in the development of commercial air transportation in a very few years, and at a cost considerably less than that already expended by European nations.

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